

# Forecast-Coordinated Operations



Cale Nasca  
Engineer, Water Resources  
Hydrology & Flood Operations Office  
DWR, Division of Flood Management

# Presentation Outline

- History
- Goals & Objectives
- Data/Models
- Decision Support System
- Future of F-CO

# 1997 Storms

- Governor's Flood Emergency Action Team Report
- Comprehensive Study
  - Recommended non-structural enhanced flood response and emergency preparedness

# Creation of F-CO Program

- Costa-Machado Water Act of 2000 (Prop 13)
  - Yuba-Feather Supplemental Flood Control Project (YCWA)
    - Created Yuba-Feather F-CO
    - Last year of design this project

# Goals and Objectives

- Goal
  - Improve flood protection w/o impacting water supply
- Objectives
  - Reduce D/S peak flood flows w/ Improved:
    - River flow forecasting
    - Coordination of reservoir flood operations
      - New Bullards Bar Reservoir (Yuba)
      - Lake Oroville (Feather)

# Cooperating Agencies

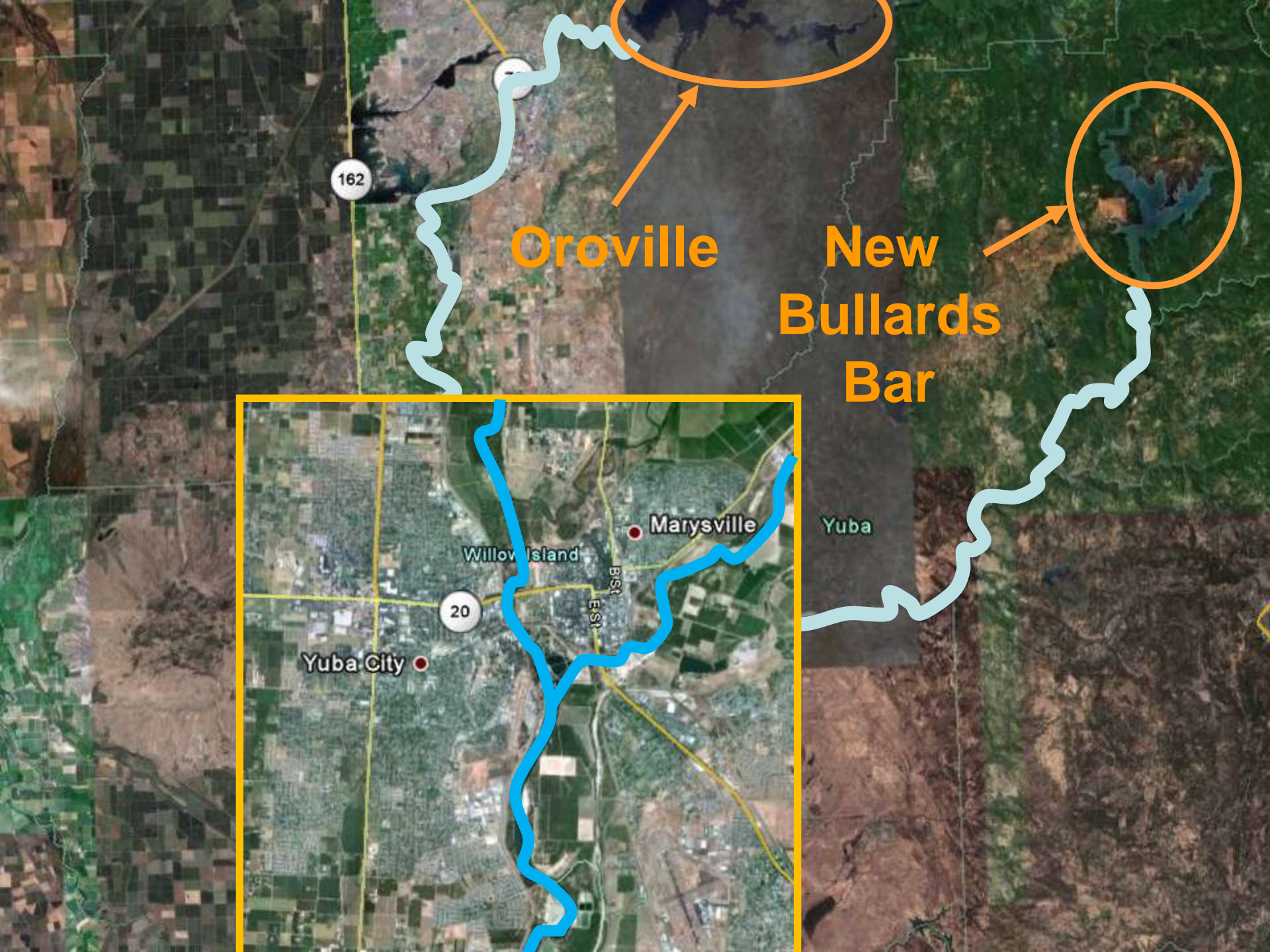
- Yuba County Water Agency (YCWA)
- California Department of Water Resources
  - State Water Project
  - Flood Management
- California-Nevada River Forecast Center
- U.S. Army Corps of Engineers





**Feather & Yuba  
Basins**

**You are here**



162

Oroville

New  
Bullards  
Bar

Yuba

Marysville

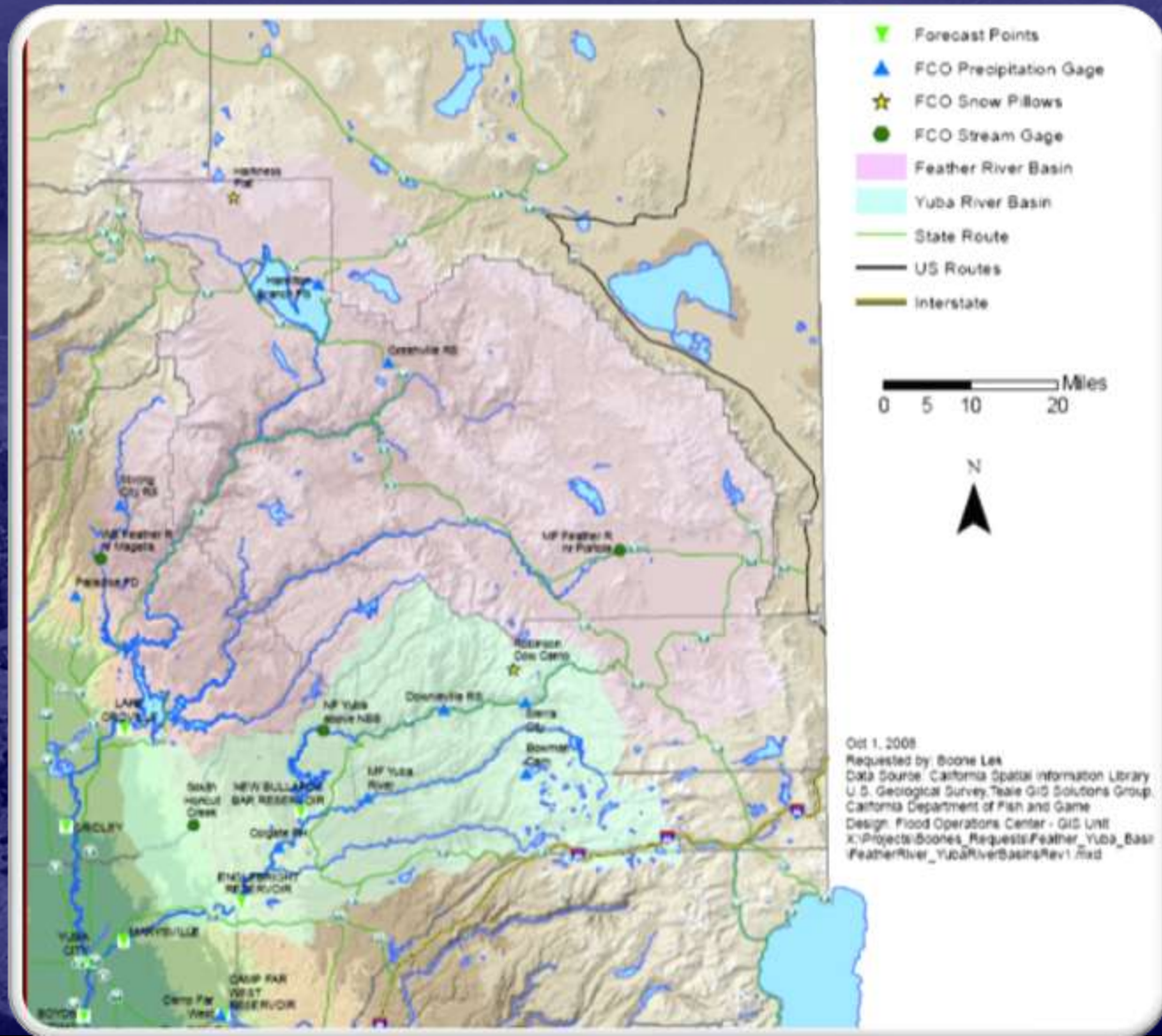
Willow Island

20

Yuba City

EST  
EST

# Gages





# National Weather Service California Nevada River Forecast Center

[Home](#)[News](#)[Organization](#)[Frequently Asked Questions](#)Search [NWS](#) [ALL NOAA](#)

Get Local Forecast for:

 [GO](#)[Search Help](#)

## Hydrology

[Precipitation Data](#)  
[River/Reservoir Data](#)  
[River Guidance](#)  
[Flash Flood Guidance](#)  
[AHPS/ESP Traces](#)  
[WFO Hydro Products](#)  
[Water Supply](#)  
[River Flood Outlook](#)  
[Google™ Maps Data](#)  
[Weather](#)

[Quick Summary](#)  
[CNRFC/HPC QPF](#)  
[Watches/Warnings](#)  
[Satellite Imagery](#)  
[Radar Imagery](#)  
[Observations](#)  
[Weather Forecasts](#)  
[Numerical Models](#)  
[Climate](#)  
[Data and Indices](#)  
[Climate Forecasts](#)  
[El Niño and MJO](#)  
[Teleconnections](#)  
[Hydroclimatology](#)  
[Local Info and Links](#)  
[Research & Outreach](#)  
[Storm Summaries](#)  
[Publications](#)  
[Newsletter](#)  
[Links](#)  
[RFC Map](#)  
[WFO Map](#)  
[Miscellaneous Links](#)  
[Information](#)

[NOAA / NWS News and Local Information](#)

**August 27, 2009 - CoCoRaHS in California and Nevada** - The Community Collaborative Rain, Hail, and Snow Network continues to expand throughout California (527 volunteers) and Nevada (167 volunteers). As the 2009-10 Winter Precipitation Season draws closer, we are still looking for volunteers to help measure precipitation data across the CNRFC area of responsibility. For more information and to sign up visit the [CoCoRaHS Website](#).

Recent Text Products:

Date/Time Issued to Web



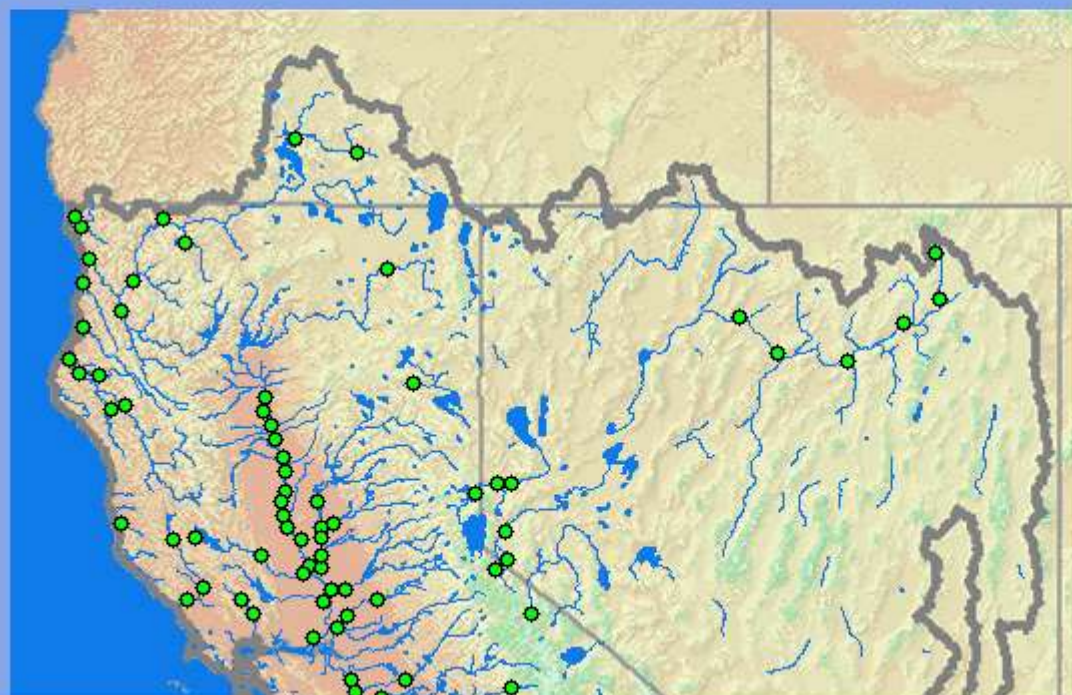
Map Type:

[Select](#)[Zoom](#)

Current Zoom Factor:

[1x](#)

Help:

[Learn More](#)[River Guidance  
\(Flood Forecast Points\)](#)[River Guidance  
\(Other Points\)](#)[AHPS/ESP Trace Analysis  
\(Create Your Own Product\)](#)

### River Guidance Forecast Status (Approx 5 Days)

- ☐ No Data or No MS / FS
- ☒ Normal Conditions
- ☐ Above Monitor Stage
- ☐ Above Flood Stage
- ☐ Above Danger Stage
- ☐ Gage Location

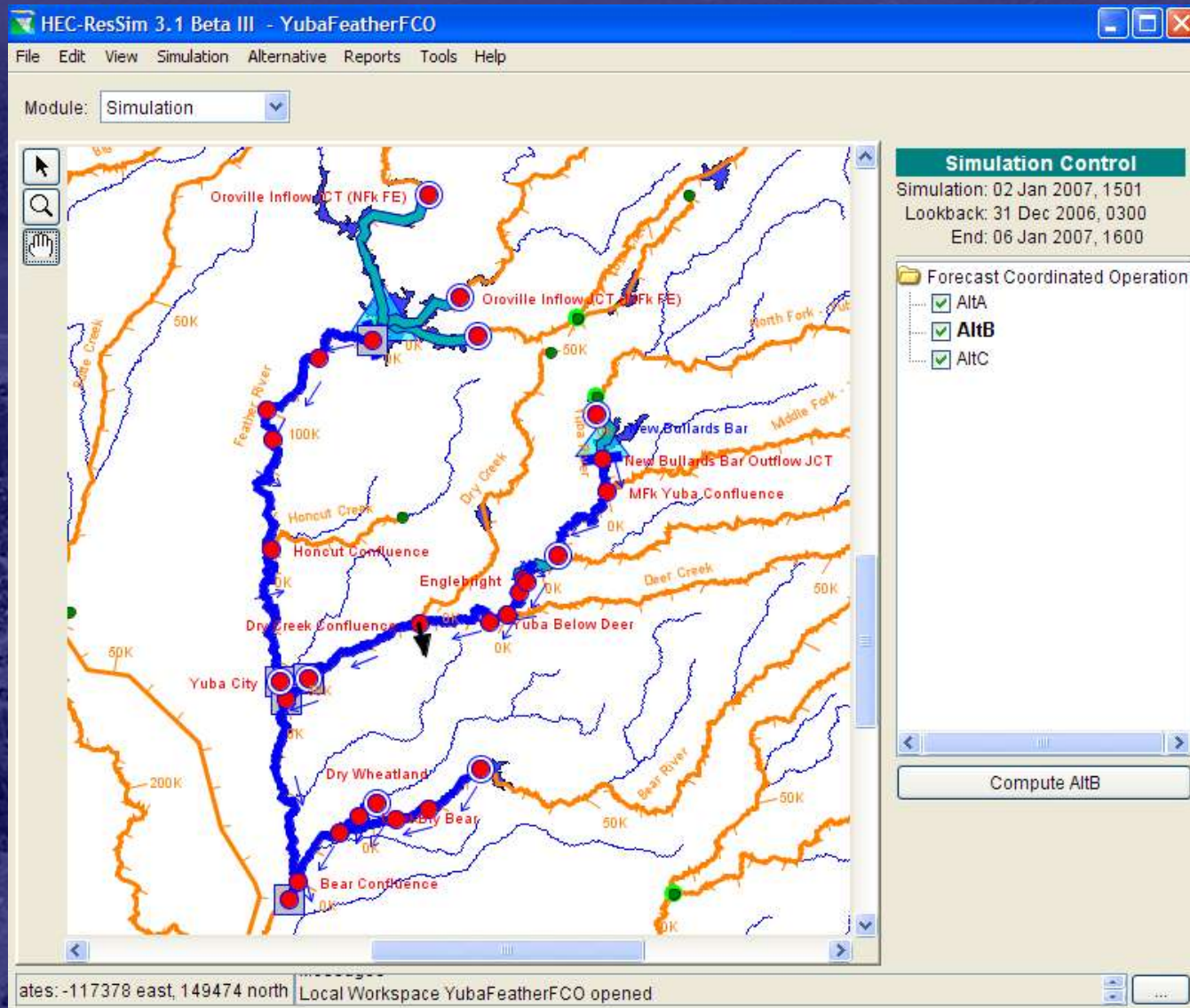
### Graphical RVF Search

[Search](#)

### Gage Information

Place cursor over gage

# HEC-ResSim Model



# Decision Support System

- Presented as a graphical user interface
  - Web based
  - Allows greater coordination between reservoir operators
    - Using the same model
    - Sharing results
    - Coordinate releases

## Reservoir Selection

ORO ☐ Set Interpolation Value

Run Simulation

Fill Projected

Fill ALT Rel

Update Display

## Time Series

## OROVILLE DAM

Date / Time

10/26/2009 12:19

Candidate

(HEC-ResSim)

Projected

Alternative

Release Override

☒ ORO

10/26/2009 07:00	5,548	2,000	2000
10/26/2009 08:00	6,056	2,000	2000
10/26/2009 09:00	5,458	2,000	2000
10/26/2009 10:00	5,140	2,000	2000
10/26/2009 11:00	4,683	2,000	2000
10/26/2009 12:00	4,210	2,000	2000
10/26/2009 13:00	4,198	2,000	2000
10/26/2009 14:00	1,698	2,000	2000
10/26/2009 15:00	600	2,000	2000
10/26/2009 16:00	600	2,000	2000
10/26/2009 17:00	600	2,000	2000
10/26/2009 18:00	600	2,000	2000
10/26/2009 19:00	600	2,000	2000
10/26/2009 20:00	600	2,000	2000
10/26/2009 21:00	600	2,000	2000
10/26/2009 22:00	600	2,000	2000
10/26/2009 23:00	600	2,000	2000
10/27/2009 00:00	600	2,000	2000

Submit Release

Fill Projected  
with AlternativeFill Alternative  
with ProjectedFill Alternative  
with Candidate

Record 2 of 174

## Scheduled Release

10/27/2009 07:00

Add

Delete

Refresh

Save

Date / Time	Release	Unconfirmed
10/26/2009 13:00	2,000	

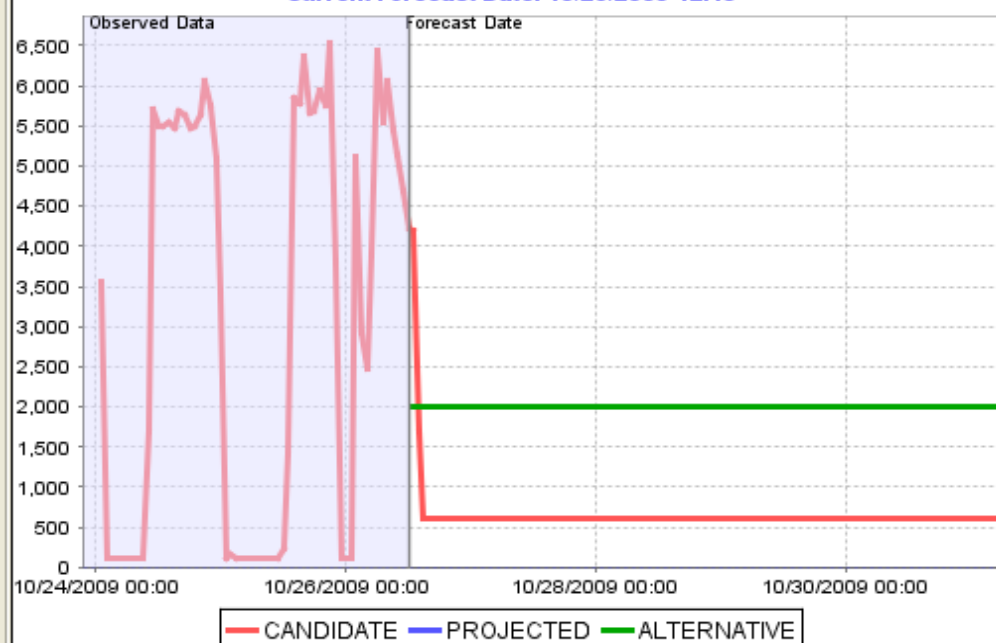
☒ Unconfirmed Release☐ Confirmed Release

Record 1 of 1

## Hydrograph

## OROVILLE COMPLEX TOTAL RIVER RELEASE

Current Forecast Date: 10/26/2009 12:19



SIM \ ESRD \

Oroville Hydrograph

NBB Hydrograph

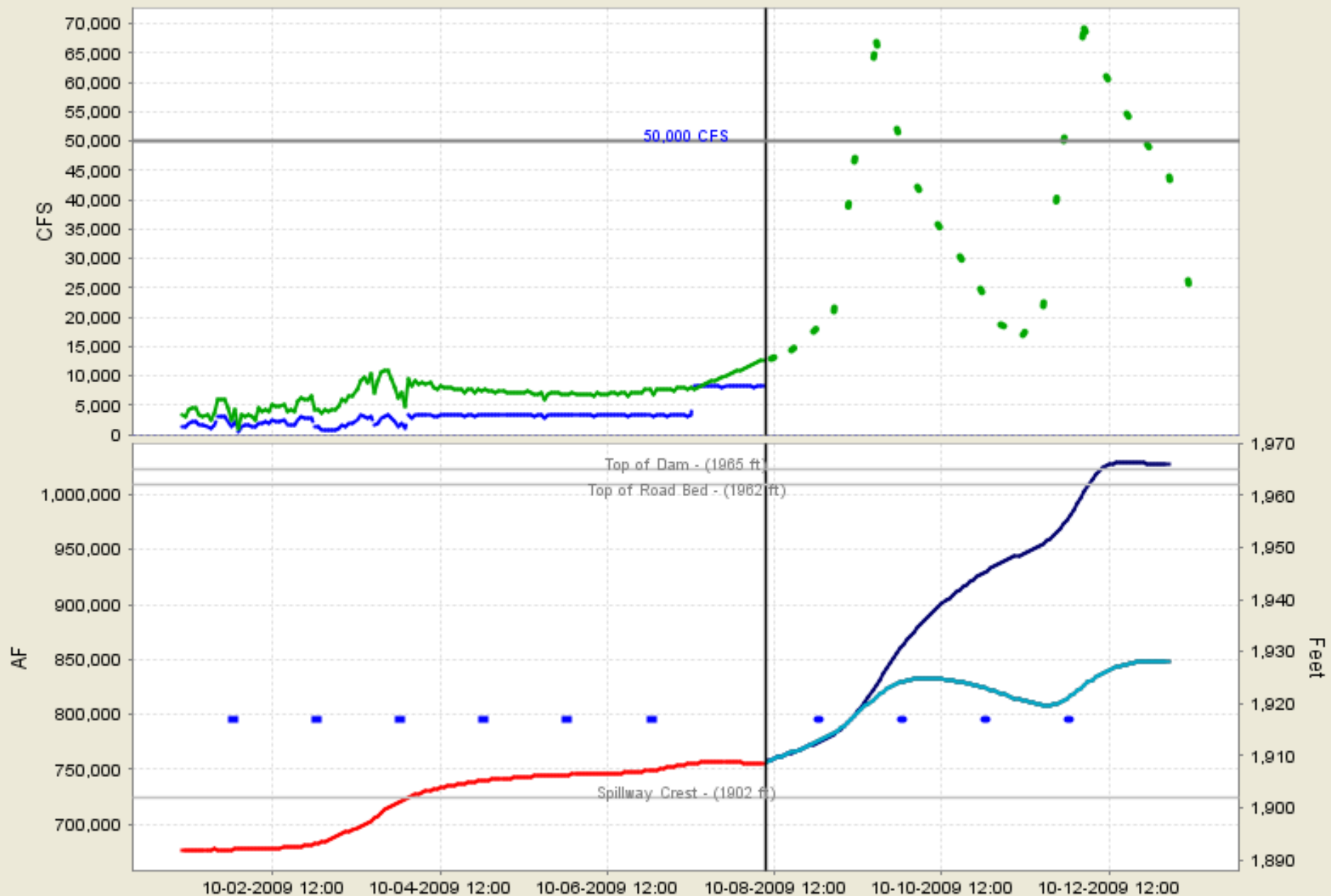
River Map

# Oroville Dam Complex

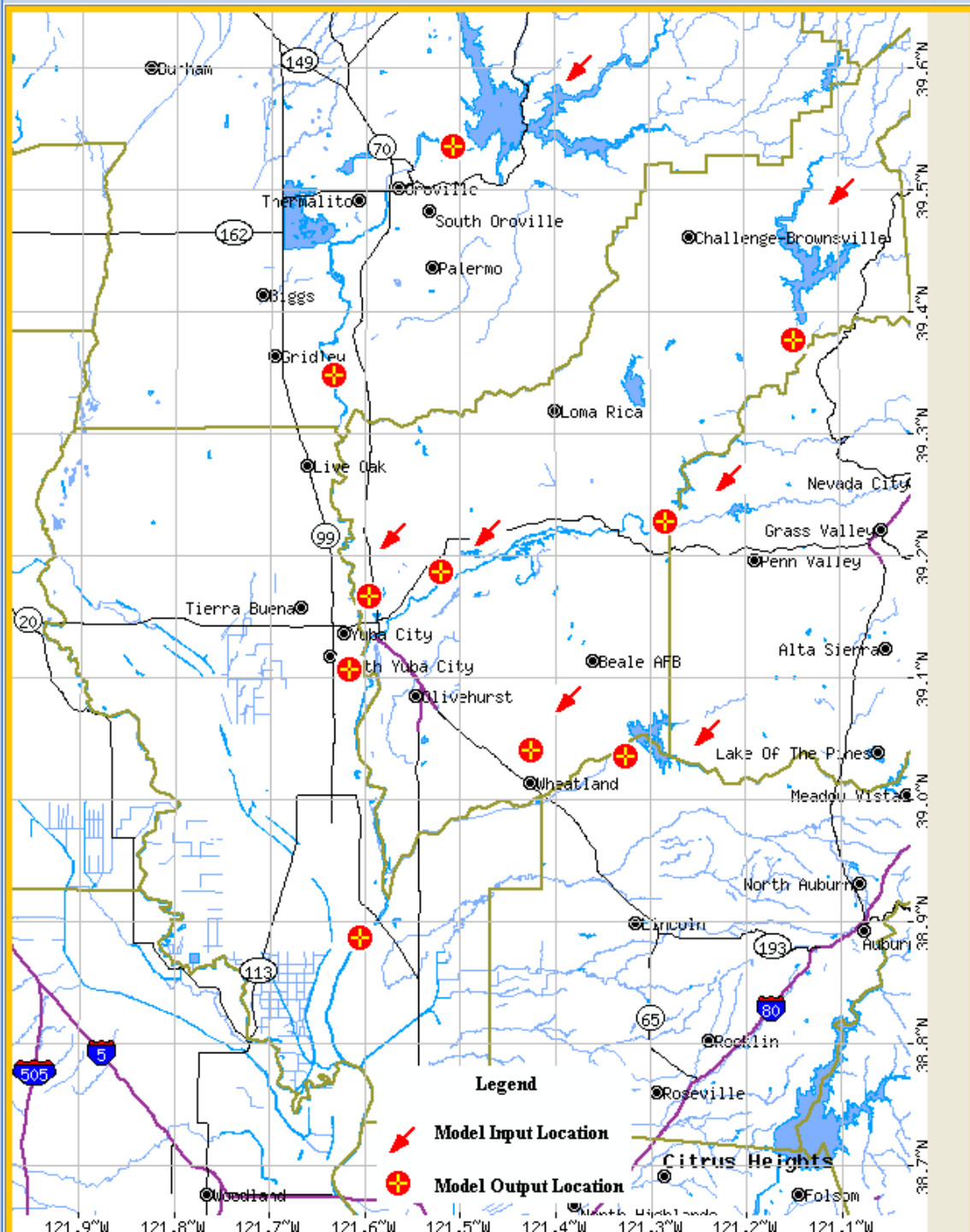


█ Wetness Index █ Feather Precip. — Inflow — Outflow ● Forecasted Inflow — Reservoir Storage ■ Observed TOC ● Forecasted TOC  
— Forecasted Candidate Storage — Forecasted Projected Storage — Forecasted Alternative Storage — Reservoir Elevation

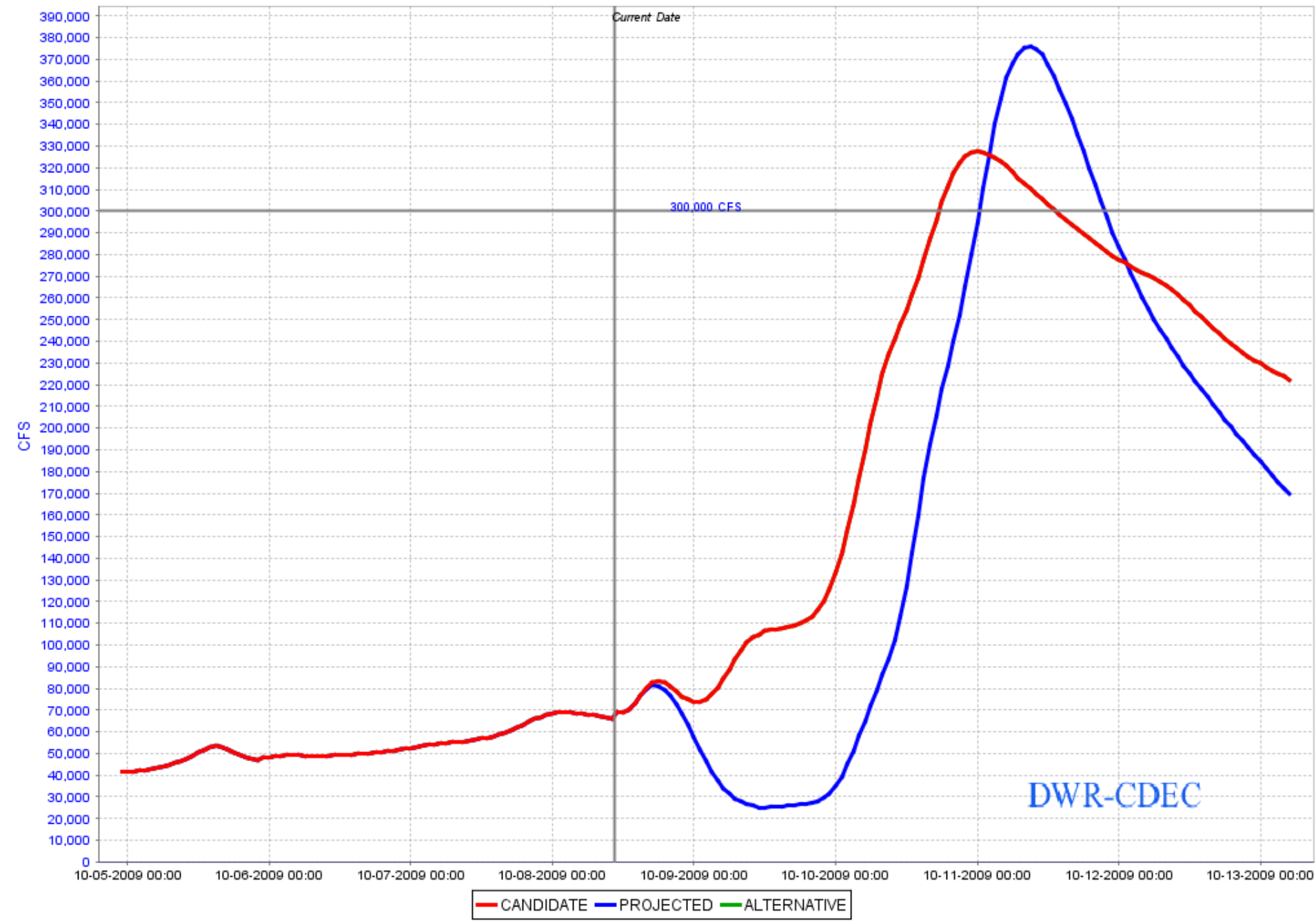
# New Bullards Bar



— Inflow 
 — Outflow 
 • Forecasted Inflow 
 — Reservoir Storage 
 ■ Observed TOC 
 • Forecasted TOC 
 — Forecasted Candidate Storage 
 — Forecasted Projected Storage 
 — Forecasted Alternative Storage 
 — Reservoir Elevation



FR + YR JUNCTION (FYC)  
Current Forecast Date : 10/08/2009 08:05  
Simulations Output



# What's Next?

- Incorporate PRMS
- Expand to other Central Valley Flood Control Reservoirs
  - Use of FloodSAFE bonds
- Potential for other Flood Control Reservoirs within California

An aerial photograph of a large, calm lake surrounded by dense forests and rolling hills. The water is a deep blue-grey, reflecting the sky. Several forested islands are scattered across the lake. In the foreground, a winding road and some cleared land are visible. The word "Questions" is overlaid in the center in a bold, orange font.

# Questions